

SEQUENCE LISTING

<110> National Cardiovascular Center

5 <120> A specific substrate and a method for determining activity of von Willebrand factor cleaving enzyme

<130>

10 <160> 12

<210> 1

<211> 2813

<212> PRT

15 <213> Homo sapiens

<400> 1

Met Ile Pro Ala Arg Phe Ala Gly Val Leu Leu Ala Leu Ala Leu Ile

1 5 10 15

20 Leu Pro Gly Thr Leu Cys Ala Glu Gly Thr Arg Gly Arg Ser Ser Thr

20 25 30

Ala Arg Cys Ser Leu Phe Gly Ser Asp Phe Val Asn Thr Phe Asp Gly

35 40 45

Ser Met Tyr Ser Phe Ala Gly Tyr Cys Ser Tyr Leu Leu Ala Gly Gly

25 50 55 60

Cys Gln Lys Arg Ser Phe Ser Ile Ile Gly Asp Phe Gln Asn Gly Lys

65 70 75 80

Arg Val Ser Leu Ser Val Tyr Leu Gly Glu Phe Phe Asp Ile His Leu

85 90 95

2/20

	Phe	Val	Asn	Gly	Thr	Val	Thr	Gln	Gly	Asp	Gln	Arg	Val	Ser	Met	Pro	
				100					105						110		
	Tyr	Ala	Ser	Lys	Gly	Leu	Tyr	Leu	Glu	Thr	Glu	Ala	Gly	Tyr	Tyr	Lys	
				115				120						125			
5	Leu	Ser	Gly	Glu	Ala	Tyr	Gly	Phe	Val	Ala	Arg	Ile	Asp	Gly	Ser	Gly	
				130				135					140				
	Asn	Phe	Gln	Val	Leu	Leu	Ser	Asp	Arg	Tyr	Phe	Asn	Lys	Thr	Cys	Gly	
	145					150					155					160	
	Leu	Cys	Gly	Asn	Phe	Asn	Ile	Phe	Ala	Glu	Asp	Asp	Phe	Met	Thr	Gln	
10					165					170					175		
	Glu	Gly	Thr	Leu	Thr	Ser	Asp	Pro	Tyr	Asp	Phe	Ala	Asn	Ser	Trp	Ala	
				180						185					190		
	Leu	Ser	Ser	Gly	Glu	Gln	Trp	Cys	Glu	Arg	Ala	Ser	Pro	Pro	Ser	Ser	
				195				200						205			
15	Ser	Cys	Asn	Ile	Ser	Ser	Gly	Glu	Met	Gln	Lys	Gly	Leu	Trp	Glu	Gln	
			210				215						220				
	Cys	Gln	Leu	Leu	Lys	Ser	Thr	Ser	Val	Phe	Ala	Arg	Cys	His	Pro	Leu	
	225					230					235					240	
	Val	Asp	Pro	Glu	Pro	Phe	Val	Ala	Leu	Cys	Glu	Lys	Thr	Leu	Cys	Glu	
20					245					250						255	
	Cys	Ala	Gly	Gly	Leu	Glu	Cys	Ala	Cys	Pro	Ala	Leu	Leu	Glu	Tyr	Ala	
				260						265					270		
	Arg	Thr	Cys	Ala	Gln	Glu	Gly	Met	Val	Leu	Tyr	Gly	Trp	Thr	Asp	His	
			275							280					285		
25	Ser	Ala	Cys	Ser	Pro	Val	Cys	Pro	Ala	Gly	Met	Glu	Tyr	Arg	Gln	Cys	
			290					295						300			
	Val	Ser	Pro	Cys	Ala	Arg	Thr	Cys	Gln	Ser	Leu	His	Ile	Asn	Glu	Met	
	305					310					315					320	
	Cys	Gln	Glu	Arg	Cys	Val	Asp	Gly	Cys	Ser	Cys	Pro	Glu	Gly	Gln	Leu	

4/20

Asp Leu Gln Lys Gln His Ser Asp Pro Cys Ala Leu Asn Pro Arg Met

575

Thr Arg Phe Ser Glu Glu Ala Cys Ala Val Leu Thr Ser Pro Thr Phe

590

5 Glu Ala Cys His Arg Ala Val Ser Pro Leu Pro Tyr Leu Arg Asn Cys

605

Arg Tyr Asp Val Cys Ser Cys Ser Asp Gly Arg Glu Cys Leu Cys Gly

620

Ala Leu Ala Ser Tyr Ala Ala Ala Cys Ala Gly Arg Gly Val Arg Val

640

Ala Trp Arg Glu Pro Gly Arg Cys Glu Leu Asn Cys Pro Lys Gly Gln

655

Val Tyr Leu Gln Cys Gly Thr Pro Cys Asn Leu Thr Cys Arg Ser Leu

670

15 Ser Tyr Pro Asp Glu Glu Cys Asn Glu Ala Cys Leu Glu Gly Cys Phe

685

Cys Pro Pro Gly Leu Tyr Met Asp Glu Arg Gly Asp Cys Val Pro Lys

700

Ala Gln Cys Pro Cys Tyr Tyr Asp Gly Glu Ile Phe Gln Pro Glu Asp

720

Ile Phe Ser Asp His His Thr Met Cys Tyr Cys Glu Asp Gly Phe Met

735

His Cys Thr Met Ser Gly Val Pro Gly Ser Leu Leu Pro Asp Ala Val

750

25 Leu Ser Ser Pro Leu Ser His Arg Ser Lys Arg Ser Leu Ser Cys Arg

765

Pro Pro Met Val Lys Leu Val Cys Pro Ala Asp Asn Leu Arg Ala Glu

780

Gly Leu Glu Cys Thr Lys Thr Cys Gln Asn Tyr Asp Leu Glu Cys Met

5/20

	785		790		795		800									
	Ser	Met	Gly	Cys	Val	Ser	Gly	Cys	Leu	Cys	Pro	Pro	Gly	Met	Val	Arg
					805					810					815	
	His	Glu	Asn	Arg	Cys	Val	Ala	Leu	Glu	Arg	Cys	Pro	Cys	Phe	His	Gln
5					820					825					830	
	Gly	Lys	Glu	Tyr	Ala	Pro	Gly	Glu	Thr	Val	Lys	Ile	Gly	Cys	Asn	Thr
					835					840					845	
	Cys	Val	Cys	Arg	Asp	Arg	Lys	Trp	Asn	Cys	Thr	Asp	His	Val	Cys	Asp
					850					855					860	
10	Ala	Thr	Cys	Ser	Thr	Ile	Gly	Met	Ala	His	Tyr	Leu	Thr	Phe	Asp	Gly
	865									870					875	880
	Leu	Lys	Tyr	Leu	Phe	Pro	Gly	Glu	Cys	Gln	Tyr	Val	Leu	Val	Gln	Asp
					885					890					895	
	Tyr	Cys	Gly	Ser	Asn	Pro	Gly	Thr	Phe	Arg	Ile	Leu	Val	Gly	Asn	Lys
15					900					905					910	
	Gly	Cys	Ser	His	Pro	Ser	Val	Lys	Cys	Lys	Lys	Arg	Val	Thr	Ile	Leu
					915					920					925	
	Val	Glu	Gly	Gly	Glu	Ile	Glu	Leu	Phe	Asp	Gly	Glu	Val	Asn	Val	Lys
					930					935					940	
20	Arg	Pro	Met	Lys	Asp	Glu	Thr	His	Phe	Glu	Val	Val	Glu	Ser	Gly	Arg
	945									950					955	960
	Tyr	Ile	Ile	Leu	Leu	Leu	Gly	Lys	Ala	Leu	Ser	Val	Val	Trp	Asp	Arg
					965					970					975	
	His	Leu	Ser	Ile	Ser	Val	Val	Leu	Lys	Gln	Thr	Tyr	Gln	Glu	Lys	Val
25																
					980					985					990	
	Cys	Gly	Leu	Cys	Gly	Asn	Phe	Asp	Gly	Ile	Gln	Asn	Asn	Asp	Leu	Thr
					995					1000					1005	
	Ser	Ser	Asn	Leu	Gln	Val	Glu	Glu	Asp	Pro	Val	Asp	Phe	Gly	Asn	Ser
					1010					1015					1020	

6/20

	Trp	Lys	Val	Ser	Ser	Gln	Cys	Ala	Asp	Thr	Arg	Lys	Val	Pro	Leu	Asp
	1025					1030					1035					1040
	Ser	Ser	Pro	Ala	Thr	Cys	His	Asn	Asn	Ile	Met	Lys	Gln	Thr	Met	Val
						1045					1050					1055
5	Asp	Ser	Ser	Cys	Arg	Ile	Leu	Thr	Ser	Asp	Val	Phe	Gln	Asp	Cys	Asn
						1060					1065					1070
	Lys	Leu	Val	Asp	Pro	Glu	Pro	Tyr	Leu	Asp	Val	Cys	Ile	Tyr	Asp	Thr
						1075					1080					1085
	Cys	Ser	Cys	Glu	Ser	Ile	Gly	Asp	Cys	Ala	Cys	Phe	Cys	Asp	Thr	Ile
10		1090					1095						1100			
	Ala	Ala	Tyr	Ala	His	Val	Cys	Ala	Gln	His	Gly	Lys	Val	Val	Thr	Trp
	1105						1110					1115				1120
	Arg	Thr	Ala	Thr	Leu	Cys	Pro	Gln	Ser	Cys	Glu	Glu	Arg	Asn	Leu	Arg
							1125					1130				1135
15	Glu	Asn	Gly	Tyr	Glu	Cys	Glu	Trp	Arg	Tyr	Asn	Ser	Cys	Ala	Pro	Ala
							1140						1145			1150
	Cys	Gln	Val	Thr	Cys	Gln	His	Pro	Glu	Pro	Leu	Ala	Cys	Pro	Val	Gln
							1155						1160			1165
	Cys	Val	Glu	Gly	Cys	His	Ala	His	Cys	Pro	Pro	Gly	Lys	Ile	Leu	Asp
20		1170						1175								1180
	Glu	Leu	Leu	Gln	Thr	Cys	Val	Asp	Pro	Glu	Asp	Cys	Pro	Val	Cys	Glu
	1185						1190					1195				1200
	Val	Ala	Gly	Arg	Arg	Phe	Ala	Ser	Gly	Lys	Lys	Val	Thr	Leu	Asn	Pro
							1205						1210			1215
25	Ser	Asp	Pro	Glu	His	Cys	Gln	Ile	Cys	His	Cys	Asp	Val	Val	Asn	Leu
							1220						1225			1230
	Thr	Cys	Glu	Ala	Cys	Gln	Glu	Pro	Gly	Gly	Leu	Val	Val	Pro	Pro	Thr
							1235							1240		1245
	Asp	Ala	Pro	Val	Ser	Pro	Thr	Thr	Leu	Tyr	Val	Glu	Asp	Ile	Ser	Glu

	1250	1255	1260
	Pro Pro Leu His Asp Phe Tyr Cys Ser Arg Leu Leu Asp Leu Val Phe		
	1265	1270	1275 1280
	Leu Leu Asp Gly Ser Ser Arg Leu Ser Glu Ala Glu Phe Glu Val Leu		
5	1285	1290	1295
	Lys Ala Phe Val Val Asp Met Met Glu Arg Leu Arg Ile Ser Gln Lys		
	1300	1305	1310
	Trp Val Arg Val Ala Val Val Glu Tyr His Asp Gly Ser His Ala Tyr		
	1315	1320	1325
10	Ile Gly Leu Lys Asp Arg Lys Arg Pro Ser Glu Leu Arg Arg Ile Ala		
	1330	1335	1340
	Ser Gln Val Lys Tyr Ala Gly Ser Gln Val Ala Ser Thr Ser Glu Val		
	1345	1350	1355 1360
	Leu Lys Tyr Thr Leu Phe Gln Ile Phe Ser Lys Ile Asp Arg Pro Glu		
15	1365	1370	1375
	Ala Ser Arg Ile Ala Leu Leu Leu Met Ala Ser Gln Glu Pro Gln Arg		
	1380	1385	1390
	Met Ser Arg Asn Phe Val Arg Tyr Val Gln Gly Leu Lys Lys Lys Lys		
	1395	1400	1405
20	Val Ile Val Ile Pro Val Gly Ile Gly Pro His Ala Asn Leu Lys Gln		
	1410	1415	1420
	Ile Arg Leu Ile Glu Lys Gln Ala Pro Glu Asn Lys Ala Phe Val Leu		
	1425	1430	1435 1440
	Ser Ser Val Asp Glu Leu Glu Gln Gln Arg Asp Glu Ile Val Ser Tyr		
25	1445	1450	1455
	Leu Cys Asp Leu Ala Pro Glu Ala Pro Pro Pro Thr Leu Pro Pro His		
	1460	1465	1470
	Met Ala Gln Val Thr Val Gly Pro Gly Leu Leu Gly Val Ser Thr Leu		
	1475	1480	1485

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	Gly Pro Lys Arg Asn Ser Met Val Leu Asp Val Ala Phe Val Leu Glu	
	1490	1495 1500
	Gly Ser Asp Lys Ile Gly Glu Ala Asp Phe Asn Arg Ser Lys Glu Phe	
	1505	1510 1515 1520
5	Met Glu Glu Val Ile Gln Arg Met Asp Val Gly Gln Asp Ser Ile His	
	1525	1530 1535
	Val Thr Val Leu Gln Tyr Ser Tyr Met Val Thr Val Glu Tyr Pro Phe	
	1540	1545 1550
	Ser Glu Ala Gln Ser Lys Gly Asp Ile Leu Gln Arg Val Arg Glu Ile	
10	1555	1560 1565
	Arg Tyr Gln Gly Gly Asn Arg Thr Asn Thr Gly Leu Ala Leu Arg Tyr	
	1570	1575 1580
	Leu Ser Asp His Ser Phe Leu Val Ser Gln Gly Asp Arg Glu Gln Ala	
	1585	1590 1595 1600
15	Pro Asn Leu Val Tyr Met Val Thr Gly Asn Pro Ala Ser Asp Glu Ile	
	1605	1610 1615
	Lys Arg Leu Pro Gly Asp Ile Gln Val Val Pro Ile Gly Val Gly Pro	
	1620	1625 1630
	Asn Ala Asn Val Gln Glu Leu Glu Arg Ile Gly Trp Pro Asn Ala Pro	
20	1635	1640 1645
	Ile Leu Ile Gln Asp Phe Glu Thr Leu Pro Arg Glu Ala Pro Asp Leu	
	1650	1655 1660
	Val Leu Gln Arg Cys Cys Ser Gly Glu Gly Leu Gln Ile Pro Thr Leu	
	1665	1670 1675 1680
25	Ser Pro Ala Pro Asp Cys Ser Gln Pro Leu Asp Val Ile Leu Leu Leu	
	1685	1690 1695
	Asp Gly Ser Ser Ser Phe Pro Ala Ser Tyr Phe Asp Glu Met Lys Ser	
	1700	1705 1710
	Phe Ala Lys Ala Phe Ile Ser Lys Ala Asn Ile Gly Pro Arg Leu Thr	

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	1715	1720	1725	
	Gln Val Ser Val Leu Gln Tyr Gly Ser Ile Thr Thr Ile Asp Val Pro			
	1730	1735	1740	
	Trp Asn Val Val Pro Glu Lys Ala His Leu Leu Ser Leu Val Asp Val			
5	1745	1750	1755	1760
	Met Gln Arg Glu Gly Gly Pro Ser Gln Ile Gly Asp Ala Leu Gly Phe			
	1765	1770	1775	
	Ala Val Arg Tyr Leu Thr Ser Glu Met His Gly Ala Arg Pro Gly Ala			
	1780	1785	1790	
10	Ser Lys Ala Val Val Ile Leu Val Thr Asp Val Ser Val Asp Ser Val			
	1795	1800	1805	
	Asp Ala Ala Ala Asp Ala Ala Arg Ser Asn Arg Val Thr Val Phe Pro			
	1810	1815	1820	
	Ile Gly Ile Gly Asp Arg Tyr Asp Ala Ala Gln Leu Arg Ile Leu Ala			
15	1825	1830	1835	1840
	Gly Pro Ala Gly Asp Ser Asn Val Val Lys Leu Gln Arg Ile Glu Asp			
	1845	1850	1855	
	Leu Pro Thr Met Val Thr Leu Gly Asn Ser Phe Leu His Lys Leu Cys			
	1860	1865	1870	
20	Ser Gly Phe Val Arg Ile Cys Met Asp Glu Asp Gly Asn Glu Lys Arg			
	1875	1880	1885	
	Pro Gly Asp Val Trp Thr Leu Pro Asp Gln Cys His Thr Val Thr Cys			
	1890	1895	1900	
	Gln Pro Asp Gly Gln Thr Leu Leu Lys Thr His Arg Val Asn Cys Asp			
25	1905	1910	1915	1920
	Arg Gly Leu Arg Pro Ser Cys Pro Asn Ser Gln Ser Pro Val Lys Val			
	1925	1930	1935	
	Glu Glu Thr Cys Gly Cys Arg Trp Thr Cys Pro Cys Val Cys Thr Gly			
	1940	1945	1950	

10/20

Ser Ser Thr Arg His Ile Val Thr Phe Asp Gly Gln Asn Phe Lys Leu

1960

1965

Thr Gly Ser Cys Ser Tyr Val Leu Phe Gln Asn Lys Glu Gln Asp Leu

1975

1980

5 Glu Val Ile Leu His Asn Gly Ala Cys Ser Pro Gly Ala Arg Gln Gly

1990

1995

2000

Cys Met Lys Ser Ile Glu Val Lys His Ser Ala Leu Ser Val Glu Leu

2010

2015

His Ser Asp Met Glu Val Thr Val Asn Gly Arg Leu Val Ser Val Pro

2020

2025

2030

Tyr Val Gly Gly Asn Met Glu Val Asn Val Tyr Gly Ala Ile Met His

2040

2045

Glu Val Arg Phe Asn His Leu Gly His Ile Phe Thr Phe Thr Pro Gln

2055

2060

15 Asn Asn Glu Phe Gln Leu Gln Leu Ser Pro Lys Thr Phe Ala Ser Lys

2070

2075

2080

Thr Tyr Gly Leu Cys Gly Ile Cys Asp Glu Asn Gly Ala Asn Asp Phe

2090

2095

Met Leu Arg Asp Gly Thr Val Thr Thr Asp Trp Lys Thr Leu Val Gln

2100

2105

2110

Glu Trp Thr Val Gln Arg Pro Gly Gln Thr Cys Gln Pro Ile Leu Glu

2120

2125

Glu Gln Cys Leu Val Pro Asp Ser Ser His Cys Gln Val Leu Leu Leu

2135

2140

25 Pro Leu Phe Ala Glu Cys His Lys Val Leu Ala Pro Ala Thr Phe Tyr

2150

2155

2160

Ala Ile Cys Gln Gln Asp Ser Cys His Gln Glu Gln Val Cys Glu Val

2170

2175

Ile Ala Ser Tyr Ala His Leu Cys Arg Thr Asn Gly Val Cys Val Asp

11/20

	2180	2185	2190
	Trp Arg Thr Pro Asp Phe Cys Ala Met Ser Cys Pro Pro Ser Leu Val		
	2195	2200	2205
	Tyr Asn His Cys Glu His Gly Cys Pro Arg His Cys Asp Gly Asn Val		
5	2210	2215	2220
	Ser Ser Cys Gly Asp His Pro Ser Glu Gly Cys Phe Cys Pro Pro Asp		
	2225	2230	2235
	Lys Val Met Leu Glu Gly Ser Cys Val Pro Glu Glu Ala Cys Thr Gln		
	2245	2250	2255
10	Cys Ile Gly Glu Asp Gly Val Gln His Gln Phe Leu Glu Ala Trp Val		
	2260	2265	2270
	Pro Asp His Gln Pro Cys Gln Ile Cys Thr Cys Leu Ser Gly Arg Lys		
	2275	2280	2285
	Val Asn Cys Thr Thr Gln Pro Cys Pro Thr Ala Lys Ala Pro Thr Cys		
15	2290	2295	2300
	Gly Leu Cys Glu Val Ala Arg Leu Arg Gln Asn Ala Asp Gln Cys Cys		
	2305	2310	2315
	Pro Glu Tyr Glu Cys Val Cys Asp Pro Val Ser Cys Asp Leu Pro Pro		
	2325	2330	2335
20	Val Pro His Cys Glu Arg Gly Leu Gln Pro Thr Leu Thr Asn Pro Gly		
	2340	2345	2350
	Glu Cys Arg Pro Asn Phe Thr Cys Ala Cys Arg Lys Glu Glu Cys Lys		
	2355	2360	2365
	Arg Val Ser Pro Pro Ser Cys Pro Pro His Arg Leu Pro Thr Leu Arg		
25	2370	2375	2380
	Lys Thr Gln Cys Cys Asp Glu Tyr Glu Cys Ala Cys Asn Cys Val Asn		
	2385	2390	2395
	Ser Thr Val Ser Cys Pro Leu Gly Tyr Leu Ala Ser Thr Ala Thr Asn		
	2405	2410	2415

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	Asp Cys Gly Cys Thr Thr Thr Thr Cys Leu Pro Asp Lys Val Cys Val	
	2420	2425 2430
	His Arg Ser Thr Ile Tyr Pro Val Gly Gln Phe Trp Glu Glu Gly Cys	
	2435	2440 2445
5	Asp Val Cys Thr Cys Thr Asp Met Glu Asp Ala Val Met Gly Leu Arg	
	2450	2455 2460
	Val Ala Gln Cys Ser Gln Lys Pro Cys Glu Asp Ser Cys Arg Ser Gly	
	2465	2470 2475 2480
	Phe Thr Tyr Val Leu His Glu Gly Glu Cys Cys Gly Arg Cys Leu Pro	
10	2485	2490 2495
	Ser Ala Cys Glu Val Val Thr Gly Ser Pro Arg Gly Asp Ser Gln Ser	
	2500	2505 2510
	Ser Trp Lys Ser Val Gly Ser Gln Trp Ala Ser Pro Glu Asn Pro Cys	
	2515	2520 2525
15	Leu Ile Asn Glu Cys Val Arg Val Lys Glu Glu Val Phe Ile Gln Gln	
	2530	2535 2540
	Arg Asn Val Ser Cys Pro Gln Leu Glu Val Pro Val Cys Pro Ser Gly	
	2545	2550 2555 2560
	Phe Gln Leu Ser Cys Lys Thr Ser Ala Cys Cys Pro Ser Cys Arg Cys	
20	2565	2570 2575
	Glu Arg Met Glu Ala Cys Met Leu Asn Gly Thr Val Ile Gly Pro Gly	
	2580	2585 2590
	Lys Thr Val Met Ile Asp Val Cys Thr Thr Cys Arg Cys Met Val Gln	
	2595	2600 2605
25	Val Gly Val Ile Ser Gly Phe Lys Leu Glu Cys Arg Lys Thr Thr Cys	
	2610	2615 2620
	Asn Pro Cys Pro Leu Gly Tyr Lys Glu Glu Asn Asn Thr Gly Glu Cys	
	2625	2630 2635 2640
	Cys Gly Arg Cys Leu Pro Thr Ala Cys Thr Ile Gln Leu Arg Gly Gly	

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	2645	2650	2655
	Gln Ile Met Thr Leu Lys Arg Asp Glu Thr Leu Gln Asp Gly Cys Asp		
	2660	2665	2670
	Thr His Phe Cys Lys Val Asn Glu Arg Gly Glu Tyr Phe Trp Glu Lys		
5	2675	2680	2685
	Arg Val Thr Gly Cys Pro Pro Phe Asp Glu His Lys Cys Leu Ala Glu		
	2690	2695	2700
	Gly Gly Lys Ile Met Lys Ile Pro Gly Thr Cys Cys Asp Thr Cys Glu		
	2705	2710	2715
10	Glu Pro Glu Cys Asn Asp Ile Thr Ala Arg Leu Gln Tyr Val Lys Val		
	2725	2730	2735
	Gly Ser Cys Lys Ser Glu Val Glu Val Asp Ile His Tyr Cys Gln Gly		
	2740	2745	2750
	Lys Cys Ala Ser Lys Ala Met Tyr Ser Ile Asp Ile Asn Asp Val Gln		
15	2755	2760	2765
	Asp Gln Cys Ser Cys Cys Ser Pro Thr Arg Thr Glu Pro Met Gln Val		
	2770	2775	2780
	Ala Leu His Cys Thr Asn Gly Ser Val Val Tyr His Glu Val Leu Asn		
	2785	2790	2795
20	Ala Met Glu Cys Lys Cys Ser Pro Arg Lys Cys Ser Lys		2800
	2805	2810	

<210> 2

25 <211> 210

<212> PRT

<213> Homo sapiens

<400> 2

14/20

Asp Leu Ala Pro Glu Ala Pro Pro Pro Thr Leu Pro Pro His Met Ala

1 5 10 15

Gln Val Thr Val Gly Pro Gly Leu Leu Gly Val Ser Thr Leu Gly Pro

20 25 30

5 Lys Arg Asn Ser Met Val Leu Asp Val Ala Phe Val Leu Glu Gly Ser

35 40 45

Asp Lys Ile Gly Glu Ala Asp Phe Asn Arg Ser Lys Glu Phe Met Glu

50 55 60

Glu Val Ile Gln Arg Met Asp Val Gly Gln Asp Ser Ile His Val Thr

10 65 70 75 80

Val Leu Gln Tyr Ser Tyr Met Val Thr Val Glu Tyr Pro Phe Ser Glu

85 90 95

Ala Gln Ser Lys Gly Asp Ile Leu Gln Arg Val Arg Glu Ile Arg Tyr

100 105 110

15 Gln Gly Gly Asn Arg Thr Asn Thr Gly Leu Ala Leu Arg Tyr Leu Ser

115 120 125

Asp His Ser Phe Leu Val Ser Gln Gly Asp Arg Glu Gln Ala Pro Asn

130 135 140

Leu Val Tyr Met Val Thr Gly Asn Pro Ala Ser Asp Glu Ile Lys Arg

20 145 150 155 160

Leu Pro Gly Asp Ile Gln Val Val Pro Ile Gly Val Gly Pro Asn Ala

165 170 175

Asn Val Gln Glu Leu Glu Arg Ile Gly Trp Pro Asn Ala Pro Ile Leu

180 185 190

25 Ile Gln Asp Phe Glu Thr Leu Pro Arg Glu Ala Pro Asp Leu Val Leu

195 200 205

Gln Arg

210

<210> 3

<211> 115

<212> PRT

<213> Homo sapiens

5

<400> 3

Glu Ala Gln Ser Lys Gly Asp Ile Leu Gln Arg Val Arg Glu Ile Arg

1 5 10 15

Tyr Gln Gly Gly Asn Arg Thr Asn Thr Gly Leu Ala Leu Arg Tyr Leu

10 20 25 30

Ser Asp His Ser Phe Leu Val Ser Gln Gly Asp Arg Glu Gln Ala Pro

35 40 45

Asn Leu Val Tyr Met Val Thr Gly Asn Pro Ala Ser Asp Glu Ile Lys

50 55 60

15 Arg Leu Pro Gly Asp Ile Gln Val Val Pro Ile Gly Val Gly Pro Asn

65 70 75 80

Ala Asn Val Gln Glu Leu Glu Arg Ile Gly Trp Pro Asn Ala Pro Ile

85 90 95

Leu Ile Gln Asp Phe Glu Thr Leu Pro Arg Glu Ala Pro Asp Leu Val

20 100 105 110

Leu Gln Arg

115

<210> 4

25 <211> 82

<212> PRT

<213> Homo sapiens

<400> 4

16/20

Asp His Ser Phe Leu Val Ser Gln Gly Asp Arg Glu Gln Ala Pro Asn

1 5 10 15

Leu Val Tyr Met Val Thr Gly Asn Pro Ala Ser Asp Glu Ile Lys Arg

20 25 30

5 Leu Pro Gly Asp Ile Gln Val Val Pro Ile Gly Val Gly Pro Asn Ala

35 40 45

Asn Val Gln Glu Leu Glu Arg Ile Gly Trp Pro Asn Ala Pro Ile Leu

50 55 60

Ile Gln Asp Phe Glu Thr Leu Pro Arg Glu Ala Pro Asp Leu Val Leu

10 65 70 75 80

Gln Arg

<210> 5

<211> 73

15 <212> PRT

<213> Homo sapiens

<400> 5

Asp Arg Glu Gln Ala Pro Asn Leu Val Tyr Met Val Thr Gly Asn Pro

20 1 5 10 15

Ala Ser Asp Glu Ile Lys Arg Leu Pro Gly Asp Ile Gln Val Val Pro

20 25 30

Ile Gly Val Gly Pro Asn Ala Asn Val Gln Glu Leu Glu Arg Ile Gly

35 40 45

25 Trp Pro Asn Ala Pro Ile Leu Ile Gln Asp Phe Glu Thr Leu Pro Arg

50 55 60

Glu Ala Pro Asp Leu Val Leu Gln Arg

65 70

<210> 6

<211> 64

<212> PRT

<213> Homo sapiens

5

<400> 6

Asp Arg Glu Gln Ala Pro Asn Leu Val Tyr Met Val Thr Gly Asn Pro

1 5 10 15

Ala Ser Asp Glu Ile Lys Arg Leu Pro Gly Asp Ile Gln Val Val Pro

10 20 25 30

Ile Gly Val Gly Pro Asn Ala Asn Val Gln Glu Leu Glu Arg Ile Gly

35 40 45

Trp Pro Asn Ala Pro Ile Leu Ile Gln Asp Phe Glu Thr Leu Pro Arg

50 55 60

15

<210> 7

<211> 30

<212> DNA

<213> Artificial Sequence

20

<220>

<223> A sense primer used in RT-PCR for obtaining Asp1459-Arg1668 region
of mature human VWF subunit

25

<400> 7

cgggatccga ccttgcccct gaagcccctc 30

<210> 8

<211> 51

<212> DNA

<213> Artificial Sequence

<220>

5 <223> An anti-sense primer used in RT-PCR for obtaining Asp1459-Arg1668
region of mature human VWF subunit

<400> 8

cggaattctc agtgatggtg atggtgatgc ctctgcagca ccaggtcagg a 51

10

<210> 9

<211> 30

<212> DNA

<213> Artificial Sequence

15

<220>

<223> A sense primer used in RT-PCR for obtaining Glu1554-
Arg1668, Asp1587-Arg1668, Asp1596-Arg1668, and Asp1596-Arg1659 regions of
mature human VWF subunit

20

<400> 9

cgggatccga ggcacagtcc aaaggggaca 30

<210> 10

25

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> A sense primer used in RT-PCR for obtaining Glu1554-Arg1668, Asp1587-Arg1668, Asp1596-Arg1668, and Asp1596-Arg1659 regions of mature human VWF subunit

5 <400> 10

cgggatccga ccacagcttc ttggtcagcc 30

<210> 11

<211> 30

10 <212> DNA

⟨213⟩ Artificial Sequence

<220>

15 <223> A sense primer used in RT-PCR for obtaining Glu1554-Arg1668, Asp1587-Arg1668, Asp1596-Arg1668, and Asp1596-Arg1659 regions of mature human VWF subunit

<400> 11

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⟨213⟩ Artificial Sequence

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<223> An anti-sense primer used in RT-PCR for obtaining Glu1554-Arg1668, Asp1587-Arg1668, Asp1596-Arg1668, and Asp1596-Arg1659 regions of mature human VWF subunit

<400> 12

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